





Unit/Standard Number	<p style="text-align: center;">Heating, Air Conditioning, Ver CIP 47.0201</p>  <p style="text-align: center;">PA Academic Standards/Eligible Content Alignment Task List</p>	<p style="text-align: center;">RWSL Academic Standards/Grade 11 Eligible Content</p>	<p style="text-align: center;">Math Academic Standards/Grade 11 Eligible Content</p>	<p style="text-align: center;">Science Academic Standards/Grade 10 & 12 Eligible Content</p>
	<p style="text-align: center;">Secondary Competency Task List</p>			
100	INTRODUCTION TO HVAC			
101	Identify HVAC systems	1.2.11.A-R R11.A.2.3.1 R11.A.2.3.1		3.1.10.A-S 3.1.10.A-S S11.A.1.1.2
102	Describe career opportunities in the HVAC profession	R11.A.2.1.1 R11.A.2.1.1		
103	Demonstrate awareness of the occupational requirements			
104	Explain the class rules and the rational behind them	R11.A.2.1.2 R11.A.2.1.2		
105	Describe and display positive student/teacher and employer/employee, student/worker attributes			
106	Identify basic refrigeration systems			
200	BASIC SAFETY			
201	Identify causes of job site accidents and measures to prevent them.	1.1.11.A-R 1.1.11.G-R 1.5.11.B-R R11.B.1.2.1 R11.B.1.2.1	M11.A.3.2.1 M11.A.3.2.1	3.7.10.A-S 3.7.10.A-S 3.7.12.A-S
202	Identify job site hazards and describe measures to prevent them from occurring. Example-OSHA standards.	R11.A.2.1.2 R11.A.2.1.2		3.7.10.A-S 3.7.10.A-S 3.7.12.A-S


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Secondary Competency Task List				
300	CONSTRUCTION MATH			
301	Demonstrate Proficiency in Math as it relates to HVAC/R	R11.A.2.3.2 R11.A.2.3.2	2.2.11.A-M 2.2.11.A-M 2.2.11.F-M 2.2.11.F-M 2.3.11.B-M 2.3.11.B-M 2.3.11.C-M 2.3.11.C-M 2.5.11.A-M 2.5.11.C-M 2.8.11.K-M 2.9.11.E-M 2.9.11.G-M 2.9.11.I-M M11.A.2.1.1 M11.A.2.1.1 M11.C.1.3.1 M11.C.1.3.1	3.1.10.D-S 3.1.10.D-S 3.1.12.D-S
400	TOOLS FOR HVAC/R			
401	Identify and Safely Use Basic Hand Tools Used in the Trade	1.2.11.A-R 1.3.11.F-R 1.3.11.F-R R11.A.2.2.2 R11.A.2.2.2 R11.A.2.4.1	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M M11.A.1.3.1 M11.A.1.3.1	3.7.10.A-S 3.7.10.A-S

		R11.A.2.4.1 R11.B.1.1.1 R11.B.1.1.1		
402	Identify and Safely Use Basic Power Tools Used in the Trade	1.3.11.F-R 1.3.11.F-R 1.6.11.D-R R11.B.1.1.1 R11.B.1.1.1	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.7.10.A-S 3.7.10.A-S 3.7.12.A-S

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	<p style="text-align: center;">Secondary Competency Task List</p>			
500	BLUEPRINT READING			
501	Identify types of blueprint plans	1.1.11.G-R	2.2.11.A-M 2.2.11.A-M	3.1.10.A-S 3.1.10.A-S 3.1.12.B-S S11.A.3.2.2
502	Read and Interpret blueprint plans	1.1.11.H-R 1.2.11.A-R R11.A.2.3.1 R11.A.2.3.1		3.1.10.A-S 3.1.10.A-S 3.1.12.B-S 3.3.10.B-S 3.3.10.B-S S11.A.3.2.2
600	BASIC COMMUNICATION			
601	Demonstrate Reading, Writing, Listening, and Speaking Skills	1.2.11.A-R 1.4.11.C-R R11.A.2.2.1 R11.A.2.2.1		3.2.10.D-S 3.2.10.D-S 3.2.12.D-S
602	Complete a Resume and Mock Interview	1.6.11.A-R 1.6.11.D-R 1.6.11.E-R		3.2.10.D-S 3.2.10.D-S 3.2.12.D-S
700	BASIC EMPLOYABILITY			
701	Demonstrate Employability Skills	1.6.11.A-R 1.6.11.B-R		3.2.10.D-S 3.2.10.D-S 3.2.12.D-S S11.A.2.1.1
702	Demonstrate Interpersonal Skills	1.6.11.A-R 1.6.11.B-R		3.2.10.D-S 3.2.10.D-S

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	800	PIPING PRACTICES			
801	Identify Piping Material		R11.A.2.2.2 R11.A.2.2.2 R11.A.2.4.1 R11.A.2.4.1 R11.B.1.1.1 R11.B.1.1.1		3.7.10.A-S 3.7.10.A-S 3.7.12.A-S
802	Select, Measure, Cut, and Ream Piping and Tubing			2.3.11.A-M 2.3.11.A-M	
803	Assemble Piping Projects and Pressure Test According to Trade Standards				3.2.10.B-S 3.2.10.B-S 3.2.12.B-S S11.A.2.1.3
804	Identify and assemble PVC pipe and fittings		R11.A.2.1.2 R11.A.2.1.2	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.7.10.A-S 3.7.10.A-S 3.7.12.A-S
805	Assemble copper tubing projects and pressure test according to trade standards				3.2.10.B-S 3.2.10.B-S 3.7.10.A-S 3.7.10.A-S 3.7.12.A-S S11.A.2.1.3
806	Solder copper tubing				3.4.10.A-S 3.4.10.A-S 3.4.12.A-S

807	Braze and silver solder ACR Tubing			3.4.10.A-S 3.4.10.A-S 3.4.12.A-S
808	Identify and demonstrate proper use of fittings and tools for steel (black) pipe	1.1.11.A-R 1.1.11.F-R R11.A.2.1.2 R11.A.2.1.2		3.7.10.A-S 3.7.10.A-S 3.7.12.A-S

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Secondary Competency Task List				
809	Cut, ream, thread and assemble steel (black) pipe	1.1.11.A-R 1.1.11.F-R R11.A.2.1.2 R11.A.2.1.2		3.7.10.A-S 3.7.10.A-S 3.7.12.A-S
810	Assemble CSST (Corrugated Stainless Steel Gas Tubing) Projects			
900 BASIC ELECTRICITY				
901	Describe methods of producing electricity using appropriate terms	R11.A.2.1.2 R11.A.2.1.2		3.7.10.A-S 3.7.10.A-S 3.7.12.A-S S11.C.1.1.1
902	Calculate basic electrical quantities using Ohm's law	1.1.11.A-R 1.1.11.F-R R11.A.2.1.2 R11.A.2.1.2	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M M11.A.1.1.3 M11.A.1.1.3 M11.A.2.1.2 M11.A.2.1.2 M11.D.3.1.2 M11.D.3.1.2	3.7.10.A-S 3.7.10.A-S 3.7.12.A-S S11.C.1.1.1
903	Explain how magnetism is used in different HVAC components	1.1.11.A-R 1.1.11.F-R R11.A.2.1.2 R11.A.2.1.2		3.4.10.A-S 3.4.10.A-S 3.7.10.A-S 3.7.10.A-S 3.7.12.A-S S11.C.3.1.4

904	Identify Safe Electrical Practices			
905	Recognize and draw various types of electrical schematics and symbols	1.1.11.A-R 1.1.11.F-R R11.A.2.1.2 R11.A.2.1.2 R11.B.3.3.4 R11.B.3.3.4		

Heating, Air Conditioning, Ver CIP 47.0201




PA Academic Standards/Eligible Content Alignment Task List

Secondary Competency Task List


RWSL Academic
Standards/Grade 11
Eligible Content

Math Academic
Standards/Grade 11
Eligible Content


Science Academic
Standards/Grade 10 & 12
Eligible Content

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	1000	INTRODUCTION TO COOLING				
1001	Measure temperature and pressure of a cooling system	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.4.10.A-S 3.4.10.A-S 3.4.12.A-S S11.C.1.1.5		
1002	Calculate Superheat and Subcooling		2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.4.10.A-S 3.4.10.A-S S11.C.1.1.5		
1003	Locate and describe components of the basic refrigeration cycle	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2		3.1.10.A-S 3.1.10.A-S 3.1.12.B-S S11.A.1.1.4		
1004	Apply Pressure Temperature Charts for various refrigerants	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.1.10.A-S 3.1.10.A-S 3.1.12.B-S S11.A.1.1.2		


1005	Describe the functions of compressors	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2		3.1.10.A-S 3.1.10.A-S 3.1.12.B-S
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1006	Describe the functions of condensers	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2		3.1.10.A-S 3.1.10.A-S 3.1.12.B-S
1007	Describe the functions of evaporators	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.1.10.A-S 3.1.10.A-S 3.1.12.B-S
1008	Describe the functions of metering devices	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.1.10.A-S 3.1.10.A-S 3.1.12.B-S
1009	Identify secondary components used in the air conditioning and refrigeration industry			
1010	Evaluate effects of airflow on system performance			3.4.10.C-S


				3.4.10.C-S
1100	INTRODUCTION TO HEATING			
1101	Describe the principles of combustion			3.4.10.B-S 3.4.10.B-S S11.C.2.1.2

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	1102	Identify temperatures and pressures of a heating system	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.1.10.A-S 3.1.10.A-S 3.1.12.B-S S11.A.3.1.1	
1103	Identify components of various heating systems					
1104	Perform maintenance on a gas furnace	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.1.10.A-S 3.1.10.A-S 3.1.12.B-S 3.2.10.D-S 3.2.10.D-S 3.2.12.D-S S11.A.2.1.5		
1105	Troubleshoot conventional / condensing gas heating equipment			3.1.10.A-S 3.1.10.A-S S11.A.3.1.2		
1106	Identify oil heating equipment	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2				
1107	Install and adjust oil fired equipment	1.6.11.A-R		3.1.10.C-S		


		1.6.11.D-R		3.1.10.C-S
1108	Perform annual preventive maintenance on oil fired equipment		2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.1.10.A-S 3.1.10.A-S 3.1.12.B-S 3.2.10.D-S 3.2.10.D-S 3.2.12.D-S S11.A.2.1.5

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1109	Troubleshoot oil fired equipment			3.1.10.A-S 3.1.10.A-S 3.1.12.B-S 3.2.10.D-S 3.2.10.D-S 3.2.12.D-S S11.A.2.1.5
1110	Identify electric heating equipment	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.1.10.A-S 3.1.10.A-S 3.1.12.B-S S11.A.2.1.5
1111	Install heating/air conditioning thermostats according to manufacturer's standards			
1112	Identify components and controls of steam heating systems			3.4.10.C-S 3.4.10.C-S
1113	Perform Combustion Analysis on oil and gas fired equipment			3.2.10.B-S 3.2.10.B-S 3.2.12.B-S S11.A.2.2.1
1200	AIR DISTRIBUTION SYSTEMS			
1201	Identify and sketch different types of duct systems	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.1.10.A-S 3.1.10.A-S 3.1.12.A-S S11.A.3.1.1


		1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	
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1202	Identify and describe the different types of duct system components	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2		
1203	Measure temperature, humidity and air velocities.	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2		3.1.10.A-S 3.1.10.A-S 3.1.12.A-S S11.A.3.1.1
1204	Determine velocity, static, and total air pressures in a system			3.4.10.C-S 3.4.10.C-S 3.4.12.C-S
1205	Determine airflow volume using velocity pressure method			3.4.10.C-S 3.4.10.C-S 3.4.12.C-S
1206	Perform basic duct fabrication functions			
1300	INTRODUCTION TO HYDRONIC SYSTEMS			
1301	Describe hot water heating system components			
1400	LEAK DETECTION, EVACUATION, RECOVERY AND CHARGING			
1401	Locate refrigerant leaks using common types of leak detectors	1.1.11.A-R 1.1.11.E-R		3.7.10.A-S 3.7.10.A-S

		1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	3.7.12.A-S 4.9.10.A-S
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	1402	Perform refrigerant recovery	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2		3.7.10.A-S 3.7.10.A-S 3.7.12.A-S 4.9.10.A-S	
1403	Perform system evacuation and dehydration	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	2.3.11.A-M 2.3.11.A-M	3.7.10.A-S 3.7.10.A-S 3.7.12.A-S		
1404	Determine when to charge with liquid versus vapor.					
1405	Weigh in correct system charge (when appropriate).		2.3.11.A-M 2.3.11.A-M			
1406	Charge systems using superheat method when appropriate (e.g., fixed restriction).	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	3.7.10.A-S 3.7.10.A-S 3.7.12.A-S		
1407	Charge systems using subcooling method when appropriate (e.g., TXV, AXV).	1.1.11.A-R 1.1.11.E-R	2.3.11.A-M 2.3.11.A-M	3.7.10.A-S 3.7.10.A-S		

			1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	2.3.11.C-M 2.3.11.C-M	3.7.12.A-S S11.C.1.1.5
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Secondary Competency Task List				
1408	Demonstrate knowledge of EPA Section 608			4.8.10.C-S 4.9.10.A-S 4.9.12.A-S S11.C.1.1.1
1500	TROUBLESHOOTING GAS HEATING			
1501	Perform gas burner flame proving tests according to trade standards			
1600	TROUBLESHOOTING COOLING			
1601	Identify control system components	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2	2.3.11.A-M 2.3.11.A-M	
1700	HEAT PUMPS			
1701	Explain heat pump modes of operation	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R 1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2		
1702	Identify and describe heat pump components	1.1.11.A-R 1.1.11.E-R 1.1.11.F-R 1.6.11.A-R	2.3.11.A-M 2.3.11.A-M 2.3.11.C-M 2.3.11.C-M	

		1.6.11.D-R R11.A.2.1.2 R11.A.2.1.2		
1800	COMPUTER FUNDAMENTALS			
1801	Identify components of a desktop computer			
1802	Utilize the Internet for research			